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WHY NOT A FORMULA FOR INSECT INFESTATIONS?

By
J. C. Evenden

Dr. Blackman's article "What is an Epidemic of Bark Beetles?" in the November number of the Western Forest Insect News opens a dormant issue among Forest Entomologists. Not only has a definition been lacking which would stand scientific scrutiny, but one which would assist in determining the line of demarcation between a normal infestation and the forerunner of an epidemic has been needed. I am very much interested in Dr. Blackman's article and the scientific definition which he has given us for a bark beetle epidemic. I feel that perhaps his definition will stand up for the mountain pine beetle as well as the Black Hill's beetle.

If we are correct in assuming that the rate of growth is a fair criterion of the resistance of a tree to bark beetle attack, then I am of the belief that the mountain pine beetle makes no choice of trees during epidemics. This belief is based upon a large number of increment cores taken from yellow pine, lodgepole pine and white pine during epidemics. However, we have but little data from trees attacked during endemic situations which is needed in order to prove this theory.

Our need for a definition of the term epidemic which will stand a scientific analysis is fully realized. I hope that at this station we will be able to secure the necessary data to test Dr. Blackman's definition as it applies to the mountain pine beetle. I also feel that we need an economic definition of this term equally as much. Dr. Blackman states that the definitions which have been used by Forest Entomologists in the past have been made arbitrarily for practical use and that they applied only to the particular species of bark beetles at hand. I wonder if these were not merely economic definitions made for the solution of the particular problem confronting the entomologist at that time.

In the past we have worked under a popular idea that under certain conditions epidemics should be controlled, while endemic situations do not warrant the expense. As all situations are different perhaps we have been obliged to make as many different definitions of an epidemic as we have had situations in order to justify this position. If we continue to follow this practice we will need an economic definition, if I may be permitted to use that term, of an epidemic.

However, as some endemic situations may be of more importance than those which we would call epidemic it would seem that we should have a formula which we could apply to our infestations in order to show the justifications of control measures. Such a formula would consider the expectation as well as the present value of the timber stands in question, the merchantability and probable date of cutting, the ecology of the forest type following the infestation, the potential danger of the infestation to adjacent timber stands, the cost of instituting and maintaining control, etc. In the institution of control work these and many other questions confront us. I wonder if we all give to each its proper weight. Why not an XYZ formula in order that we can discard our ouija boards?

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1925 AND 1926 BEETLE LOSSES IN SOUTHERN OREGON.

The fifth annual beetle survey of about 3,000,000 acres of yellow pine in southern Oregon has just been completed. An effort was made to get the 1926 loss figures even though part of this loss is still represented by dying trees with normal green foliage. As in previous years, brevicomis is responsible for practically all of the losses. The data haven't been worked up for the ten districts into which the survey area is divided but the general situation is about as follows. There has been a decided decline in some of the epidemic areas and an increase in others. By and large, the 1926 endemic losses are heavier than they were in 1925. The 1926 beetle losses are heavier than they were in 1925. The 1926 beetle loss for the entire area is somewhat greater than that for 1925. With the possible exception of one rather limited epidemic in the Fort Rock district no control measures are thought to be urgently needed in the spring of 1927.

A.J. Jaenicke.

REPELLING ATTACKS OF BARKBEETLES POSSIBLE.

Experiments consisting of using various sprays as repellents to prevent attacks of the mountain pine beetle (Dendroctonus monticolae, Hopk.) on lodgepole pine which were conducted in the Crater Lake National Park, Oregon during the past season indicate some measure of success.

These experiments have not yet been carried beyond the initial stages and the results to date are not to be considered conclusive. However, they are significant in that they indicate the way to further experiments which when carried out may lead to eventual success in this important phase of barkbeetle control.

Of the sprays used those which so far have offered the greatest measure of success are, in the order of best results attained:

Sodium fluoride, (saturated solution),
Kerosene, (full strength),
DuPont No. 43, (strength; 2 ozs. suspended in ½ gal. water),
Pyridin, (13 ozs. Pyridin in kerosene to 1 gallon).

These solutions were used in the form of sprays applied by a hand sprayer. The trees treated ranged in size from 6" to 16" DBH. The sprays were applied on the trunks from the ground to a height of 20 feet. None of these sprays had a deleterious effect on the foliage or tender growth of the branches.

The experiments were conducted during the period July 1 to September 15 which corresponds with the attack period of this beetle in the Park. The sprays applied in early July apparently were effective throughout the above season of attack. Only trees which had received a few attacks were utilized in the experiments. By selecting only such trees, it was definitely known in advance that the beetles had already selected them for attack. The few attacking beetles in these trees were dug out and killed before the sprays were applied. After spraying many of the trees treated were not again attacked and none of them were subjects of a normal attack.

During the period of these experiments the weather conditions were exceptionally favorable. No rains occurred during the season of attack. Owing to these conditions the duration of the effectiveness of the sprays was not determined for normal weather conditions.

J.E. Patterson.

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KANAB STATION CLOSED.

The station at Kanab has been closed for the winter. Edmonston has taken a three month's furlough which he intends to spend at Tucson, Ariz. Hofer has been transferred temporarily to the Federal Horticultural Board to assist in the survey to determine the abundance and location of the Thurberia cotton boll weevil in southern Arizona.

H.E. Burke.

AN INSECT ROBBER.

The following statement by Dr. A.D. Hopkins is found in his Bul.#83, on the Genus Dendroctonus, published in 1909 - "The so-called robbers consist of large bark boring grubs or larvae of long horned beetles (cerambycids) which sometimes rob the bark beetle larvae of their food supply or kill them outright by destroying the inner bark before the broods of bark beetles have completed their development.

In connection with the Cascadel experiments of 1926, Dr. Craighead suggested that some studies should be made to determine the effect of the cerambycid, Graphisurus spectabilis, on the brood mortality of the western pine beetle (D. brevicomis). Similar studies on the Kaibab Forest had indicated that certain cerambycids were of some importance in reducing broods of the Black Hills beetle, (D. ponderosae).

In this study, four trees were used, numbered 3,4,5, and 6. They were 28, 34, 26, and 28 inches in diameter respectively and were killed by the first generation attacks of D. brevicomis in May, 1926.

Method:

After the trees had been abandoned by the D. brevicomis broods, they were felled and three to five large slabs of bark were peeled from each tree. From each of these slabs two sections of bark, each one a foot square, were selected, one with the least amount and the other with the greatest amount of inner bark destroyed by cerambycids, for the slab. This gave a number of pairs of bark, each pair selected from the same part of the trunk, but showing the greatest possible difference in the amount of cerambycid work on the inner bark. D. brevicomis emergence from the two sections from each pair was then compared.

Results:

Seventeen pairs of sections or 34 sq. ft. of bark were examined. In 14 pairs the D.b. emergence was appreciable higher from the section with the least amount of cerambycid work. In one pair the D.b. emergence was about the same from both sections. In only two pairs was the D.b. emergence less from the sections with the least amount of cerambycid work.

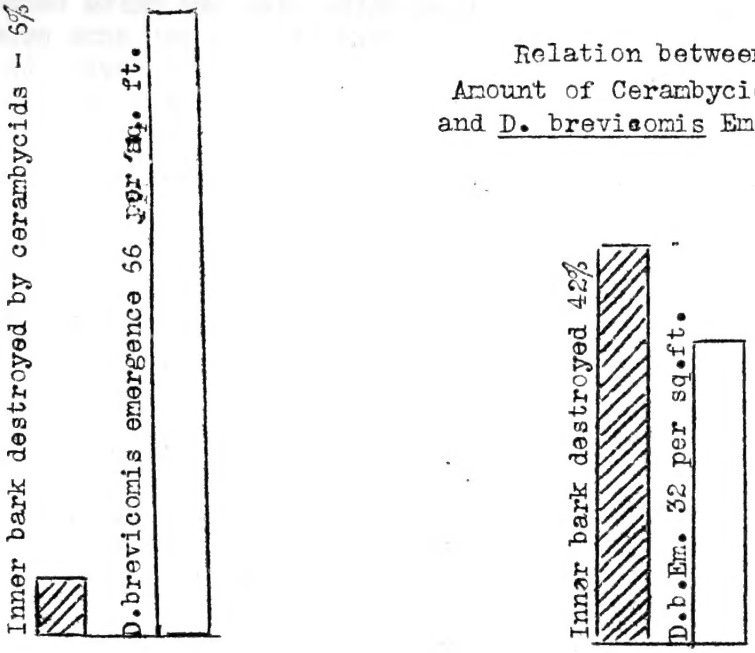
The results by trees are given in the accompanying graph. In every case the D.b. emergence was higher from the sections with the small amount of cerambycid work. The averages for the four trees shows that the emergence from the sections with little or no cerambycid work was twice as high as from the sections where the cerambycids had destroyed around 40% of the inner bark.

As there was no appreciable difference in the number of D.b. attacks or the number of predators in the two sections from each pair it seems evident that the cerambycids had an appreciable effect on the brood mortality on the trees studied with the possible exception of tree #6.

The present data is insufficient for any general conclusions but they do indicate a lead that might be profitably followed.

H.L.Person

Relation between
Amount of Cerambycid Work
and D. brevicomis Emergence.



Averages for four trees.

H.L.Person

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FIELD WORK IN OREGON AND WASHINGTON.

I believe that Evenden's position that often our field work takes so large a proportion of our time that necessary reports and desirable publications are crowded off the schedule is well taken. Some of the research bureaus of the Department of Agriculture are recognizing this danger by greatly curtailing field work of the research men until their "paper work" is in good shape.

My field season began on May 16 and will end in a few days (December 1) and during that period of 6½ months only 12 days were spent in the Portland office. The following is a time analysis of my field work for 1926:

Examination of status and need of control of epidemics Dendroctonus infestations on Oregon and Washington National Forests in Sitka spruce, yellow pine and lodgepole	66 days
Monticolae control project in lodgepole on recreation areas at Diamond Lake in southern Oregon (Spring and Fall)	37 "
Fifth annual beetle survey of three million acres of yellow pine in Klamath and Lake countries, Oregon	35 "
Fire duty in eastern Washington	30 "
Yellow pine brush disposal study in Oregon and Washington . . .	15 "
Annual meeting of N.W. Assn. of Pathologists, Entomologists and Horticulturists at Tacoma, Wash.	3 "
Total field days . . .	186 "

A.J.Jaenicke.

A MONTICOLAE NOTE

Yellow pine, lodgepole, western white pine and white barked pine (P. albicaulis) were found in an infested condition on the same quarter section on the Rainier National Forest in eastern Washington during the past summer. Dendroctonus monticolae was the offending culprit in each case.

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A.J.Jaenicke.

INSECTS APT TO BE EXPORTED IN PACIFIC COAST TIMBER.

Foresters of several foreign countries are on the lookout for insects that are apt to be introduced into those countries in imported timber. Quarantines against American lumber undoubtedly will be enforced if conditions are found to warrant it. It, therefore, will be well worth the while of Pacific Coast lumbermen to use considerable care to see that only uninfested material is shipped from our ports.

As practically all of the timber shipped from American ports is sawn there is very little danger of exporting any of our destructive tree killing barkbeetles or other tree killing species. A few destructive barkborers which go into the sapwood to transform may live through the transportation period and escape into the forest of foreign countries.

The great majority of the species liable to be exported are those that live for most of their lives in the sapwood and heartwood of standing or felled trees. The most important of these are horntail larvae belonging to the wood wasp family Siricidae, flathead borers and roundhead borers of the beetle families Buprestidae and Cerambycidae, powder post beetles of the families Bostrichidae and Lyctidae and ambrosia beetles of the families Platypodidae and Scolytidae.

Since the work of most of these insects takes place while the tree is standing or soon after it is felled, there is little excuse for not detecting and culling the infested material when it is scaled. Woodwasps, however, sometimes lay their eggs in sawn timber, and in that case there would not be any evidence of infestation at the time of shipment.

Treatment in the dry kiln would kill any of these pests and would be a safe method of control if one was thought necessary.

H.E.Burke.

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BARKBEETLE INFESTATION ON ASPEN LAKE BURN

The Aspen Lake Fire, which covered about 7,800 acres west of Klamath Falls during the latter part of June, 1926, caused some very heavy damage to valuable yellow pine timber. On about 2,600 acres the fire crowned and either killed the trees outright or defoliated them. It is expected that trees in the latter type of injury will attract the western pine beetle and the area is being studied for this development. Mr. Patterson made an examination in November and found only a few attacks in the defoliated trees. If a concentration of barkbeetles materializes within the burn area it will probably occur during the 1927 season.

J.M.Miller

INSECTS AND DISEASE TOO MUCH FOR THE TREES.

Early in the season of 1922 an examination was made of an area near McCall, Idaho, containing approximately 600 acres of splendid yellow pine. The foliage of the trees within this area was badly faded due to the presence of a needle disease. This fungus was later determined by Doctor Meinecke as Hypoderma deformans, a needle disease of yellow pine. On many of the trees there were large quantities of witches broom, which Doctor Meinecke state was often associated with this disease. As this condition had apparently existed within the area for several years it was not considered as being serious.

During the summer of 1922 a serious epidemic of the pine butterfly (Neophasia menapia Felder) occurred in this country. During the two years which the epidemic existed many thousand acres of yellow pine were defoliated. During the first year of the epidemic the area containing the needle disease was but lightly attacked, but in 1923 the defoliation was rather severe. The year following the cessation of this outbreak many trees were observed throughout the defoliated areas which were apparently dying from the effects of the defoliation. This loss was noticeable more severe in the area containing the needle fungus than in the other more heavily defoliated regions. Though large numbers of these trees were examined, in no instance were insects (other than defoliators) found to be responsible for their death. The cambium of these trees was in a sticky, fermented, condition and in some cases there was such an excess of moisture that the bark at the base of the tree was saturated. In these saturated trees the moisture would run in a stream from an axe cut or hole made with increment borer.

In 1925 the loss of timber in the area of the needle fungus was so severe that a salvage cutting of over 30% of the total volume was made. In other areas where the defoliation had been very severe during both years of the butterfly epidemic, the loss of timber from this cause was not more than 5%. To account for this difference it was thought that perhaps the needle disease had weakened the trees through a reduction of growth to such an extent that it had contributed largely to their death. A sample plot was established within this area and increment cores taken from green healthy trees as well as the dead and dying. The measurement of these cores were in turn checked by cores taken from a sample plot in a severely defoliated area at New Meadows, Idaho.

Sample Plot in Area Containing Needle Disease.

	Average D.B.H.	Average number Rings last ½"	Average width last 10 years.
Twenty-five green healthy trees.	38	15	48/100"
Twenty-five dead and dying trees.	38	24	33/100"
	Sample plot, New Meadows, Idaho.		
Twenty-five healthy trees.	36	16	38/100"

From the above table we note that the dead and dying trees were producing a smaller increment than the healthy trees in both plots. Furthermore, there was practically no difference in the rate of growth between the green trees infested with the needle disease and those from the New Meadows area. Would the fact that there were large quantities of witches broom on the dead and dying trees, while on the green trees there were practically none, explain this condition?

J.C. Evenden.

THE RIGHT DOPE ON THE PEAGGIES.

"The Indians, in parties, are now ready to gather Peaggies and they dig a trench around the trees 10 to 16 inches deep and 2 feet wide. The Peaggies drop from the tree trunk into these trenches in great numbers where the Indians gather them in baskets made from willows and shaped like a cornicopia. When their baskets are filled they are taken to camp by the women, the men gathering to have the baskets filled by the time the women return. When all are gathered and brought to camp the process of curing begins. The Indians throw up great heaps or mounds of earth building fires on these mounds until the earth is hot enough to bake. The fire is then drawn and the Peaggies are mixed alive into this hot earth and are left until about half done. They are a yellowish brown in color and tough but pliable. They separate the Peaggies from the earth with baskets used as sieves and are then spread out to dry in the shade but the Indians keep burning fires continuously until the Peaggies are thoroughly cured. The heat from the sun will spoil them. After being cured. this way they are put into sacks and kept in a cool place.

The Indians then move them to their homes in the valley where they use these Peaggies in stew consisting of Peaggies, potatoes and salt and pepper- if they like they add other vegatables. Some of the white people who have eaten of this kind of stew say it has the flavor of mutton. This stew has a creamy color and is served with bread made from pinenuts or of sun flower seed ground very fine."

Guy S. Way. Inyo Nat.For.

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The above account by Ranger Way is the best information that we have on the process used by the Mono Indians in preparing this article of their diet. In the last issue I made the statement that the larvae were killed by dipping them in hot water, a piece of information handed to me by one of the packers of the Yosemite region who had never witnessed the process. Mr. Way has made a very thorough first hand study of the methods used by the Indians in collecting the Pandora moth larvae.

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BLACK HILLS BEETLE EPIDEMIC IN COLORADO

An examination to determine the extent and seriousness of the Black Hills beetle infestation on the Colorado National Forest has recently been requested by the District Forester. It is thought that the infestation extends over an area of about 200 square miles, part of it being in the Rocky Mountain National Park. Mr. H.L.Person has been detailed to make a preliminary survey and if weather permits will carry this out during December.

J.M.Miller.

CONTROL OPERATIONS IN LODGEPOLE.

Diamond Lake in southern Oregon is a recreation center of considerable importance. It is estimated that ten thousand campers used four miles of the shore line of Diamond Lake during the past summer. On much of this shore line, lodgepole is the only tree which offers shade and protection to the campers.

For several years, the mountain pine beetle has ravaged the lodgepole stands on tens of thousands of acres in the general vicinity of Diamond Lake as well as the stands along the shore of the lake.

In the spring of 1926 about 800 infested lodgepole were cut and burned on a three-mile strip of the much-used shore line with an average width of less than one-fourth mile. In October, 1926, an addition of 165 infested trees were cut in the area covered by the Spring control operations. About two-thirds of these new trees immediately adjoined those which were treated in the spring. It was evident that scorching of the standing green trees in the spring was an important factor in the distribution of the newly infested trees. For this reason, fall control work was undertaken. The trees were cut, bucked up into logs and the logs and brush piled. Heavy rains prevented the burning of the piles, even with the aid of torches but as early in the spring as possible, the logs and brush will be burned. Due to the heavy use of the area by campers, the sun-curing method used by Patterson on the Crater Lake National Park with good success, is not desirable because of the unsightly appearance and the fire hazard of the unburned material.

This project is of special interest because it represents an effort to control a monticolae infestation on a small area of high value which represents only a limited portion of the large infested area in the Diamond Lake region.

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A.J.Jaenicke.

MANUSCRIPTS

Keen, F.P. - Insect Enemies of California Pines and Their Control.

A complete, well illustrated manuscript for a bulletin on the insect enemies of California pines to be submitted for publication by the California State Board of Forestry.

REPORTS

Blackman, M.W. - Re-examination of Trap Trees of 1925.

Report on the relation of yellow pine trap trees to attacks by D. valens,, D. approximatus and D. ponderosae in the Kaibab Forest.

Brood Counts for 1926.

A report on brood counts of D. ponderosae in yellow pine on the Kaibab National Forest.

Effects of Experimental Treatments on Brood of D. ponderosae.

Relation of Increment Growth to attack by D. ponderosae in Group Killings of Various Sizes.

CURRENT LITERATURE.

Bailey, H.L. - Important Tree Insects of Vermont. Bul. 35, Vermont Dept. Agric.

Chamberlin, W.J. - Bombing the Bugs, Western Flying, Nov. 1926. pp.7,8,28, 3 figs.
An account of the use of airplanes in the distribution of poisons to control insect infestations. Describes in detail experiments conducted during 1926 in Oregon against orchard and field crop insects. Suggests airplane dusting as the only practical control for insect defoliations of forest trees.

Curran, C.H. - A New Sawfly Infesting Cottonwood in British Columbia (Hymenoptera Tenthredinidae) Can.Ent. LVII Sept.,1926, pp.233-234.
Description of Pteronidea nigriventris which causes severe damage to cottonwoods of Agassiz, B.C.

Editorial Correspondence - White ants attack untreated Poles. The Timberman, Sept. 1926. p. 182.
Notes on damage to poles in Southern California and discussion of methods of control used in various parts of the world.

Snyder, Thomas E. - Insect Metal Workers. Nature Magazine, Nov.1926.pp.277-280 8 figures.
A popular, well illustrated account of insects that damage metals, especially telephone cables and fuses.

Termite Damage in California. The Timberman, Nov. 1926. p. 254.
Discussion of damage caused by termites, especially to poles and recommendation of methods of control to be used.

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GIBSON TO CONTINUE GRADUATE WORK.

On December 1st Mr. A.L. Gibson leaves the Coeur d' Alene Station to accept an assistantship at the University of Minnesota. We are very glad that this opportunity was presented to Mr. Gibson and that he was able to take advantage of it. Mr. Gibson plans to return soon after June the 1st in order to continue the studies of the mountain pine beetle in lodgepole pine which were started in 1925.

J.C.Evenden.